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International fiscal spillovers☆

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ABSTRACT

A two-country business cycle model featuring nominal rigidities, countercyclical mark-ups, rule of thumb consumers and government spending reversals is used to identify inequality predictions that are robust across a range of empirically plausible parameterizations. These robust inequality restrictions are imposed onto a regime-change factor model for the United States and its main trade partners to estimate the international fiscal spillovers. The effects of U.S. government spending on foreign real activity are found to be sizable and significant, operating mainly by lowering real interest rates rather than boosting trade balances. In contrast, there seems to be only limited evidence of state dependence in the international transmission of fiscal policy.

1. Introduction

The great recession of 2007–09 has reignited the discussion in policy and academic circles about the economic circumstances under which fiscal policy (and government spending in particular) can stimulate the economy, both domestically and internationally. On the theoretical side, recent contributions have shown that accommodative monetary policy has the potential to alter the transmission of fiscal policy in closed economy models (Hall, 2009; Woodford, 2011, and Christiano et al., 2011) as well as in multi-country models (Cook and Devereux, 2011 and Coenen et al., 2012).

On the empirical side, Canova and Pappa (2011) report that whenever a fiscal expansion is associated with negative real short-term interest rates, the domestic fiscal multipliers in the United States, United Kingdom and the Euro area tend to be somewhat larger than the estimates based on various identification schemes reported in Blanchard and Perotti (2002), Mountford and Uhlig (2009) and Barro and Redlick (2011). Auerbach and Gorodnichenko (2012) show that the fiscal multipliers are typically larger during recessions whereas, using a longer sample, Ramey and Zubairy (2014) find little evidence for state-dependent government spending multipliers in the United States.

While the dynamic response of the real exchange rate to a U.S. fiscal shock has been the subject of a rapidly growing empirical literature (Monacelli and Perotti, 2011; Ravn et al., 2012, and Enders et al., 2011), little is known on whether international fiscal spillovers – defined as the response of foreign output to a domestic fiscal shock conditional on fiscal policy abroad – are (i) positive, (ii) heterogeneous across trade partners and (iii) varying over time.

In this paper, we address this important gap in the literature by identifying international fiscal spillovers. Our reference framework is a two-country real business cycle model featuring countercyclical markups (in the spirit of Ravn et al., 2012), sticky prices and wages, rule of thumb consumers (a la Galí et al., 2007), and government spending reversals (following Corsetti et al., 2010, 2012). The contributions above have shown that each of these channels has the potential to alter the effects of government spending.

The theoretical framework is used to derive a set of sign restrictions in the dynamic responses to a government spending shock that are robust across a range of empirically plausible parameterizations of these

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theoretical mechanisms. The robust sign restrictions are then imposed onto a change point factor model for the U.S. economy and its main trade partners over the post-Bretton Woods period. Following Kilian and Murphy (2012), we impose the additional restriction that the size of the domestic fiscal multiplier cannot be implausibly higher than the point estimates available in the literature for the U.S. Finally, while the empirical model allows fiscal policy in the foreign economy to adjust following a U.S. government spending shock, the analysis in Section 4 reveals that the response of foreign government spending is often insignificant across countries and regimes, implying that our estimates can be interpreted as the international fiscal spillovers holding foreign government spending constant.

The choice of a factor model fulfills our desire to identify government spending shocks using large information, which Forni and Gambetti (2010) and Gambetti (2010) have shown to ameliorate the non-fundamentalness problem raising from fiscal foresight in small-scale VARs. More specifically, as shown conceptually by Leeper et al. (2013), whenever government policies are anticipated by the public and the variables used by the econometrician span a smaller information set than available to the agents, identification strategies based on combinations of VAR residuals fail to recover the structural shocks. The reason is that the VAR residuals are still contaminated by the component of government spending that the agents could have predicted using the variables omitted by the econometrician. In contrast, a large information approach, as taken in this paper, is more likely to avoid the distorted inference associated with fiscal foresight.

Time-variation is introduced because our sample is characterized by significant changes in (i) the conduct of fiscal policy (Davig and Leeper, 2006, and Bianchi and Ilut, 2011) and monetary policy (Cogley and Sargent, 2005), (ii) business cycle conditions and (iii) the volatility of structural shocks (Primiceri, 2005, and Sims and Zha, 2006), ranging from the 1970s great inflation to the great moderation and finally the great recession. To avoid taking a stand a-priori on the most relevant source of changes (and its precise timing), our statistical model identifies in the data the most likely break points.

Our main results can be summarized as follows. First, the probability of a positive response of foreign output to an unanticipated increase of government spending in the United States is typically larger than fifty percent over the post-Bretton Woods period (especially after 1984), with the largest effects recorded for Canada and the United Kingdom. Second, an expansionary U.S. government spending shock leads to a significant decrease in real rates, both domestically and internationally, but small and insignificant changes in the trade balances. We interpret this as suggestive that the international transmission of fiscal policy might operate through a financial channel rather than a trade channel. Third, we find little support for regime dependence: both the spending multipliers and the international transmission of government spending shocks seem remarkably stable over the statistical different regimes identified by our factor model, and neither the adoption of the Euro nor the state of the business cycle (either internationally or domestically) seem to have led to a significant change in the international transmission of U.S. fiscal policy.

In the rest of the paper, Section 2 introduces the theoretical framework and illustrates the way we nest a number of hypotheses for the international transmission of fiscal policy. It also reports the inequality predictions (for the dynamic effects of a government spending shock on the endogenous variables) that are robust to a wide perturbation of the parameter space. These theory-robust sign restrictions are imposed in Section 3 onto a factor model for the U.S. economy and some of its main trade partners. Results are presented in Section 4 before conclusions. The appendices provide details of the theoretical model, the estimation of the empirical model, data and variance decomposition. We also relegate to the Appendices a discussion of the propagation of the various theoretical transmission channels, and further details on the identification of the sign restrictions.

2. Theoretical framework and sign restrictions

The reference framework is a two-country New-Keynesian model augmented with countercyclical markups, rule of thumb consumers and government spending reversals. Each of these ingredients is meant to exemplify a specific channel within a broad class of competing models for the international transmission of fiscal policy.

There are two symmetric countries, and in each country two types of firms: final good and intermediate good firms. Final good firms combine home and foreign intermediate products into a homogeneous consumption good. We assume home bias in the production of the consumption good as a reduced-form device to modeling trade openness. While final good firms operate under perfect competition, intermediate producers set their price under monopolistic competition and Calvo price stickiness, using differentiated labor services as the only factor of production.

On the household side we introduce both asset holders and rule of thumb consumers. These two types of agents differ in that only asset holders can access international capital markets and transfer wealth into the future. We assume that the elasticity of substitution varies procyclically with aggregate output, so as to give rise to countercyclical markups. As for policy, the monetary institution is captured by a Taylor rule, while the government takes the shape of a fiscal rule that allows for spending and taxes to respond to the real level of debt, so as to produce spending reversals.

In the special case where prices and wages are fully flexible, the mark-up is constant, the budget is balanced at all times and there are no rule-of-thumb consumers, the model boils down to the standard neo-classical model. Introducing procyclical elasticity of substitution over this benchmark gives us the counter-cyclical markup model; introducing both price and wage rigidity coupled with either limited asset market participation or fiscal feedback rules will provide a benchmark for the rule of thumb model and spending reversal model, respectively. Because the different specifications allowing for rule of thumb consumers, spending reversals and countercyclical markups are relatively standard in the literature, details of the model and derivation of the log-linearized system of equation is relegated to the web Appendix C. We refer to the web Appendix D for an illustration of differences and similarities in the propagation of the various theoretical channels.

Using the nested framework where rule of thumb consumers, countercyclical markups, government spending reversals as well as stickiness in wages and prices are allowed to interact with each other, we are able to identify sign restrictions for government spending shocks that are common across empirically plausible perturbations of the parameter space. We find that following a positive government spending shock, (i) government spending, (ii) taxes, and (iii) domestic output, increase on impact, while the response of (iv) the government budget surplus, is non-positive. Furthermore, the nesting model generates a positive comovement (v) between short-term nominal interest rate and inflation, and (vi) between consumption and real exchange rate.[1]

It is worth noting that our sign restrictions on the joint response of output, budget surplus and taxes uniquely identify the government spending shock. Any other shock that is included in the nesting model would generate opposite comovements between primary budget surplus and taxes. For instance, expansionary TFP, monetary, preference, labor supply, and markup shocks would increase surplus and decrease taxes. For more details on the computation and the

[1] The parameter values used in the simulations are drawn from uniform distributions over 10,000 repetitions. Our results indicate that the inequality predictions (i) to (iv) are satisfied in every single draw. The restrictions (v) and (vi) are instead satisfied in 97.7% and 99.4% of the draws, respectively.